



**INVENTION:** Multiple Data Rate Complex Walsh Codes for CDMA

**INVENTORS:** U.A. von der Embse

## ABSTRACT

The present invention describes new multiple data rate algorithms for complex Walsh and hybrid complex Walsh orthogonal CDMA channelization encoding and decoding of multiple data rate users, which generate a means to accomodate multiple data rate users over the same CDMA frequency band using complex Walsh and hybrid complex Walsh orthogonal codes. Complex Walsh and hybrid complex Walsh orthogonal CDMA codes have been disclosed in a previous patent application for constant data rate communications. The means of this invention is to provide complex Walsh and hybrid complex Walsh with the means to separate the different data rate users in the sequency domain of the complex Walsh analogous to the current use of different frequency bands for the different data rate users. Sequency for complex Walsh and hybrid complex Walsh codes is the average rate of phase angle rotations of the code vectors, and is analogous to frequency in the Fourier domain.

Current art uses algorithms to generate multiple code length real Walsh CDMA orthogonal codes for the next generation wideband CDMA (W-CDMA), which are orthogonal variable spreading factor (OVSF) CDMA codes. Variable spreading factor refers to a variable code length. The present invention provides a means to significantly improve CDMA performance for multiple data rate users by allowing the use of the new complex Walsh and hybrid complex Walsh CDMA orthogonal codes in place of the real Walsh OVSF CDMA orthogonal codes and with implementation means for fast and computationally efficient encoding and decoding.